BENJAMIN GARVER LAMME

A Tribute to a Great Engineer, Singularly Distinguished

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BENJAMIN GARVER LAMME (1864-1924) was Chief Engineer of the Westinghouse Electric and Manufacturing Company, with which he was connected for thirty-five years.

Mr. Lamme received the Edison medal, awarded annually by the American Institute of Electrical Engineers for electrical achievement. He was one of its two representatives on the Naval Consulting Board during the war, serving as Chairman of the Inventions Committee which directed investigations and passed upon hundreds of schemes for the detection and destruction of submarines. These testify to his standing in his own profession as an engineer and inventor.

He received a unique distinction from his alma mater, Ohio State University. The first award of a recently established medal, eligible to all of its fifteen thousand alumni, engaged in every field of activity, was made to him in recognition of the value of his work to the world. Such an award to an engineer, and to Lamme, is of peculiar significance. What sort of a student, what sort of a man was Lamme? What qualities does his career indicate contribute to the making of a great engineer?

It would be interesting to consult the Class Day prophecy of 1888 to note the career predicted for a member who held first rank in his classes but was little known outside the engineering group, who figured in no major or minor sports, who belonged to no fraternity or literary society, who took no part in social affairs, who was quiet and retiring, of few words and with nothing in appearance or manner indicating intrinsic capability. But the man ranking low in many qualities often counted essential to success, won in life achievement. Why?

Many may imagine that an electrical engineer and inventor of pre-eminence must be a wizard of some sort; but he had no occult powers, he was no visionary. He was simple and unassuming in manner and mind and method. His magic wand for transforming new ideas into realities was a trained mind. He could think clearly, analyze a problem into its fundamental elements, proceed directly from cause to effect or vice versa. He had vision, persistence, purpose. He was a productive thinker because he worked many hours and with high efficiency.

My own recollection of student days gives a clew to his success. In the fall of '85 (I had received my A. B. in June) I took Analytic Mechanics with the engineering juniors. I can name only one student and recall but one outstanding incident. Professor Robinson said a page or so of the four or five pages of problems at the end of the chapter would be a reasonable task. The next morning Lamme asked me how many I had done. I gave an apologetic answer and reversed the question. He quietly replied, "Well, I didn't have anything else to do so I worked them all."

Nearly four years later, shortly after Lamme had begun work with the Westinghouse Company on May 1, 1889, I remembered that sentence when Mr. Schmid asked me, "Do you know that man Lamme? Can he figure?" And nearly forty years later, considerably more than half of which we worked in the same building many years at adjacent desks, that sentence seems to reveal certain life characteristics—an interest in mathematical-mechanical problems, diligent effort at a self-imposed task far exceeding the normal expectation, a superpreparedness, a joy in accomplishment. His work as a student and as an engineer was not something apart from him, but it was a part of him.

As chief engineer of his company Lamme interviewed many young men. To determine present aptitudes he

ascertained what they liked to do as boys, believing no one would make a real engineer who had not shown certain early traits and likings.

Notes Tell of Early Life

He left some notes in which he traces his own career in a sort of self-analysis. His earliest recollections concern the hunting of curious stones in a ployed field. He continued to gather Indian relics, such as stone axes and hammers and arrow heads. In his will he leaves to the University his treasured and rich collection. He enjoyed building blocks and mechanical toys. He liked to work with tools and made little water wheels which he placed in the stream. He tinkered around machinery whenever opportunity afforded. The real pleasure was in finding out how things worked and why they were made in certain ways. These interests in childhood matured into interest in design in later years. An early aptitude later proving of highest importance was a liking for elementary mathematics. The wise teacher in an old-fashioned country school let the scholars work out things in their own way.

Lamme enjoyed mental arithmetic, partitcularly the relations of numbers. (In later life he patented some magic square puzzles.) The multiplication table, which we learned to 12, he learned to 25, then to 36. He developed curious and quick methods and a sense of proportion. While classmates in college thought mathematics "came easy" to him, he was studying more hours than they did. He endeavored to get a physical

conception of mathematical ideas and relationships. Later in life he had an uncanny way of working out a result in his head before another man could get it on a slide rule. He used a slide rule for a short time but discarded it as the mechanical operation caused him to lose his quantitative sense and his facility for mental computation; furthermore, results were not retained mentally as they had been. Visualization and physical conception of principles and problems he employed constantly in his engineering work. Mathematical computation and analytical ability were closely associated. As a boy he directed his analytical ability to the characteristics of his schoolmates as well as to mathematical problems. A critical sense and persistency were other traits of youth which continued through life.

He determined, when a boy, to be an engineer; he set about to make an engineer of himself and he did.

Following his junior year, owing to the illness and death of his father, Lamme spent a year at home on the farm near Springfield. After graduation from the Mechanical Engineering course he spent a half year at home, reading in spare hours Sylvanus Thompson's "Dynamo Electric Machinery," a compendium of historical and descriptive information. He sought the underlying principles and got a grasp on the idea of the magnetic circuit, then little understood. When he came to the Electric Company in Pittsburgh, he had a preparedness which was unsuspected. His evenings for many years he spent largely in study. He has said that often his quick and confident answer to some new question has been attributed to some intuitive insight which others do not possess instead of the hours of painstaking analytical study which had already given him the answer.

Opportunity is futile unless one is prepared. Lamme was prepared when opportunity came. He graduated at the opportune moment when the electric current was establishing its usefulness for light and power, and when the greatest problem was how to make bigger and better electrical machines; he was fortunate in the progressive leadership of George Westinghouse, who gave not only opportunity to design and construct, but incentive and impetus and inspiration; he was peculiarly fortunate in the early guidance and co-operation of Albert Schmid, a master in mechanical design.

Proved Equal to Opportunity

Mr. Westinghouse had for two or three years been exploiting a new system, the alternating current system. sition from without and technical difficulties from within. There were engineering criticism and commercial oppo- The largest generators were less than two hundred horsepower. There were no commercial motors. There was no way to convert from alternating to direct current. The need and the opportunity were great. The design of new types of generators, of polyphase motors of various types, of synchronous converters, of an alternating-current railway system; all these presented gigantic problems which Lamme met and solved. Present and proposed super-power systems and the utilization of power in industries and in railways employ the system on which he worked and most of the apparatus follows the designs which he inaugurated. He had many good assistants and much was done elsewhere, but Lamme was pioneer and leader; he originated new types and they have persisted. To him is due a far larger proportion of the prominent types of apparatus now in use than to any other designer. And his judgment was so good that he spent little effort on types which soon disappeared.

Lamme never gave up. To him a defeat was a challenge. If trouble occurred, he at once sought a remedy —often he had already determined what to do if difficulties did arise. On one occasion there were serious troubles in an important installation. An official of the Company said, "Lamme, this will be your monument or your tombstone." This did not perturb him. Now it is his monument.

Lamme was far more than an individual designer of particular machines, although he might well rest his reputation on the design of the single reduction railway motor, the machines exhibited at the World's Fair in Chicago, the generators which inaugurated power production at Niagara, those which supply power to the Elevated and Subway systems in New York and the equipment which operates theNew York, New Haven & Hartford Railroad. He says that his work was mostly analysis rather than design. He developed a system and method of simple rational design. He directed and taught others and during recent years his principal interest and activity and enthusiasm were in the selection and training of men. He conducted a design class each year, he took active interest in *The Electric Journal* as chairman of its publication committee, suggesting topics and writers, critically reviewing manuscripts, and often summoning writers for conference, being particularly concerned in developing young engineers in clear thinking and expression. He wrote and spoke on engineering education. Years ago the electrical engineer was an isolated individual. Now invention and development and design are conducted by groups of men who work together. Lamme started as an individual but he developed an organization and left in his department a hundred men with the advantage of his knowledge, his experience, his methods and his inspiration.

His Genius Was Contagious

Modest and retiring, he was a genial and inspiring companion to those who knew him. In later years, his reticence was somewhat overcome and he wrote papers and made some addresses. His clear and simple presentation, free from mathematical formula, made his writings highly appreciated. He regarded mathematics as a tool and did not exhibit his tools when the work was done.

He never married, but made a home with his sisters. One of them, Miss Bertha, graduated from Ohio State in engineering and became a competent designer under her brother's direction, but ceased engineering to become Mrs. Feicht. He was a broad reader, he liked travel, he was fond of the best music and was interested in archaeology; he became an ardent and expert photographer, and when he finally got an automobile he drove it nearly ten thousand miles in six months and knew all the roads within a hundred miles.

Habitual optimism and indomitable courage waged a long struggle against an incurable disease. With hopeful cheer he concealed his early fears and to the last his knowledge from his immediate family. Again he had prepared for emergency by deciding on plans for continuing his work and on the provisions in his will. He died July 8, 1924.

Established Medals and Scholarships

Even associates and friends little suspected how sincere was his interest in education and his Alma Mater until revealed by his will. He provides for a medal to be awarded by the American Institute of Electrical Engineers for meritorious achievement in the development of electrical apparatus or machinery; also for a medal to be awarded by the Society for the Promotion of Engineering Education for accomplishment in technical teaching or actual advancement in the art of technical training. He provides a medal for meritorious achievement in engineering or the mechanical arts by a graduate of one of the technical departments of the Ohio State University; also for two scholarships to be awarded to the

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most capable students in the mechanical and electrical engineering courses during their senior year. All these awards—incentives for advancing the profession he loved—are to be made annually. There is also provision for continuing the education of eleven French orphans, wards of his for several years past. He visited them in France about a year ago, he heard from them often and his last replies—individual and personal—he dictated just three weeks before his death.

"An Extraordinary Ordinary Man"

Summing it all up, after an acquaintance of many years and after talking with many who have worked with him and known him best, he was an extraordinary ordinary man. He had developed ordinary qualities to an extraordinary degree.

We all know the multiplication table, but he knew more of it and could use it better. He was an able mathematician, but what he used most were mathematical reasoning and mental arithmetic. Most of us reason from effects back to causes, but he was wonderfully expert in getting directly back to the really fnudamental starting point. He visualized and simplified his problems. He used short cut, direct methods in mathematics, in analysis, in action. He was unusually patient and persistent. When he had worked through to a conclusion, it became a conviction and he had the courage of his convictions.

Lamme was one of those whose greatness lay in the perfection and practice of common traits and homely virtues. The qualities which made him great would contribute to success in many fields, but are especially important to the engineer.